NEXT G ALLIANCE
An ATIS Initiative

System View and Architecture for 6G

The 6G series workshop by Hexa-X-II

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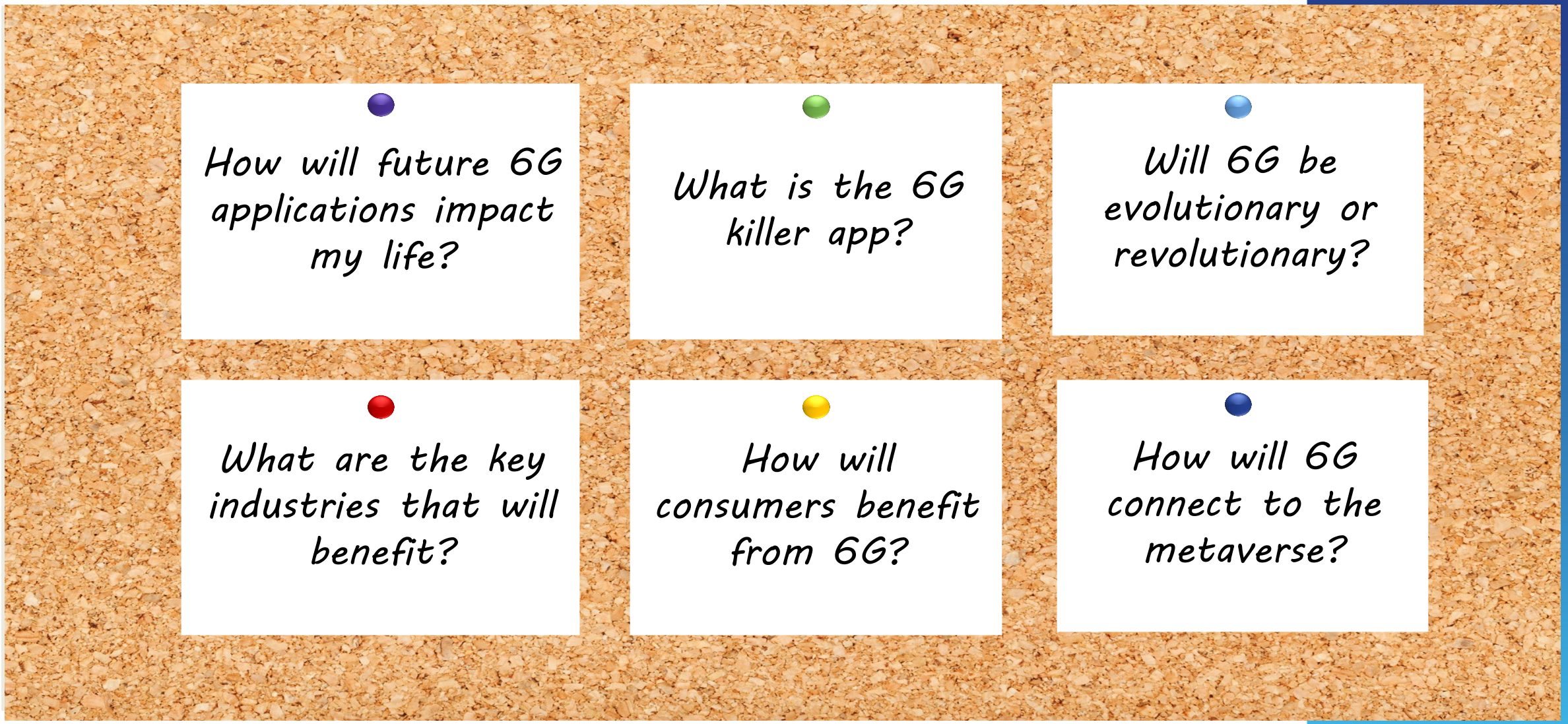
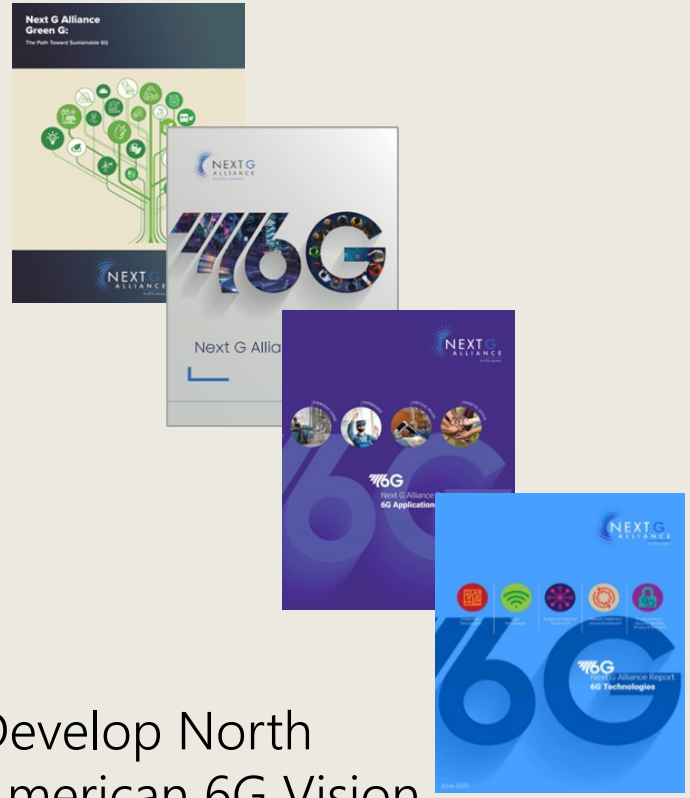
Chair, NRWG, NGA

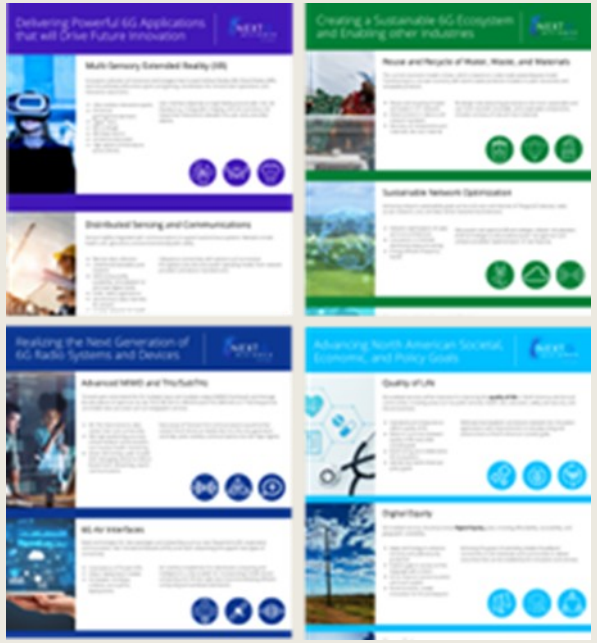
Opening Thoughts



NGA's Journey to 6G



Develop North American 6G Vision



https://www.nextgalliance.org/research-priorities/

Align on a collective set of 6G Research Priorities

Create 6G Public Private Partnership for Next Frontier of Innovation and Investment

[6G Library – Next G Alliance]

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Change How We Live

Home-based patient care

Remote surgery and scanning

AI-enabled patient digital twin

Ambient assisted living

V2V and V2P safety improvement and awareness

Autonomous, coordinated and remote driving

Real-time 360° situational awareness

Leveraging EGE innovation for education

Metaverse experiences

Immersive knowledge and learning

Hologram receivers

Next Gen mission critical communications

AR headsets and glasses

Networked robots and UAVs

Connected ambulances

Change How We Work

Factories of the future

AI-managed automatic guided vehicles

Massive sensors to manage environment and resources

Movement between farming and road infrastructure

High precision irrigation and fertilizer treatments

Massive sensing and remote actuation

Communications across mobile and NTN

Extreme connectivity

Tele-operation for hazardous environments

Use of digital twin replicas

High precision accuracy and tracking

Urbanization density and access to resources

Zero energy IoT devices

AI-driven data decision-making

Government-provided playing fields for 6G innovation

North America's Six Audacious Goals

- Top priorities for North America's contribution and Next G leadership
- Selected by Next G Alliance membership
- Address multiple stakeholder interests

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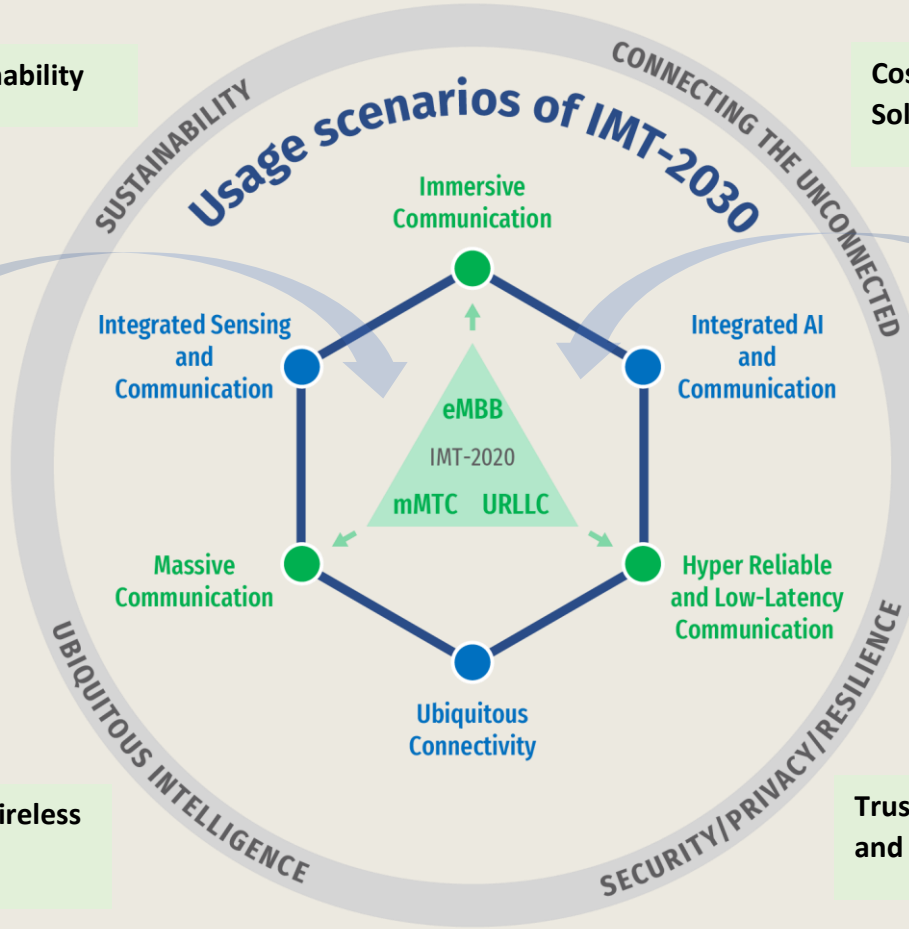
Mapping of NGA Audacious Goals to usage scenarios and overarching aspects of IMT-2030



Sustainability

Cost-efficient Solutions

Digital World Experiences

Distributed Cloud and Comm. Systems

AI-Native Wireless Networks

Trust, Security and Resilience

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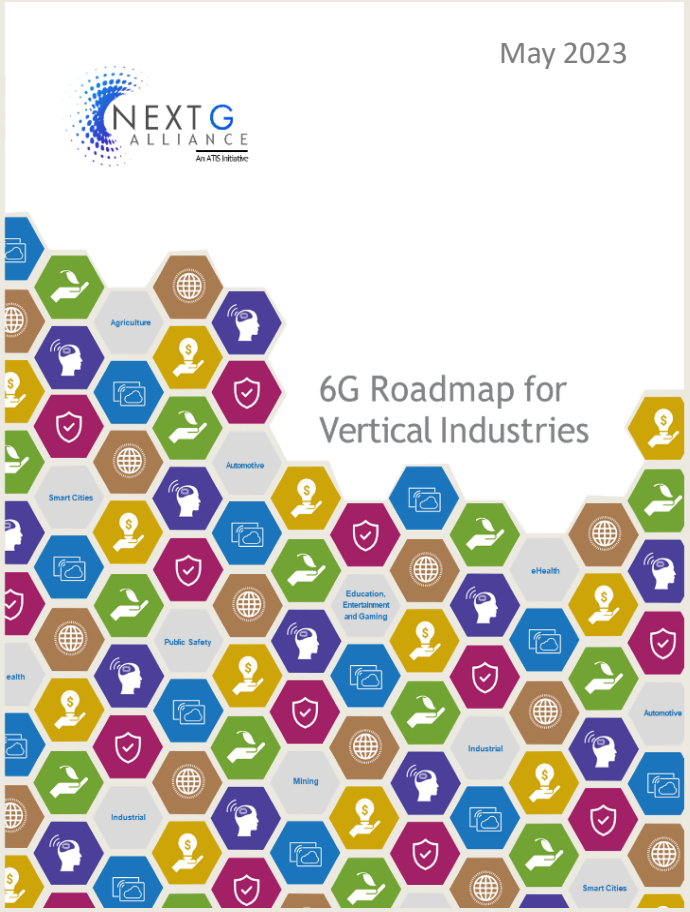
NGA's Top 10 Research Priorities

1) Security, Trust, & Resilience
2) New Radio Components and Antennas
3) Network Convergence and Integration
4) AI/ML
5) Spectrum Sharing and Enhanced Spectrum Access
6) Radio Access Technologies
7) Joint Communication and Sensing
8) Architecture and Control of Open, Disaggregated Systems
9) Sustainability / Reduced Energy Consumption & Cost
10) Cloud Native Networks and Distributed Cloud

6G Roadmap for Vertical Industries



Agriculture

Automotive

Education, Gaming and Entertainment

eHealth

Industrial

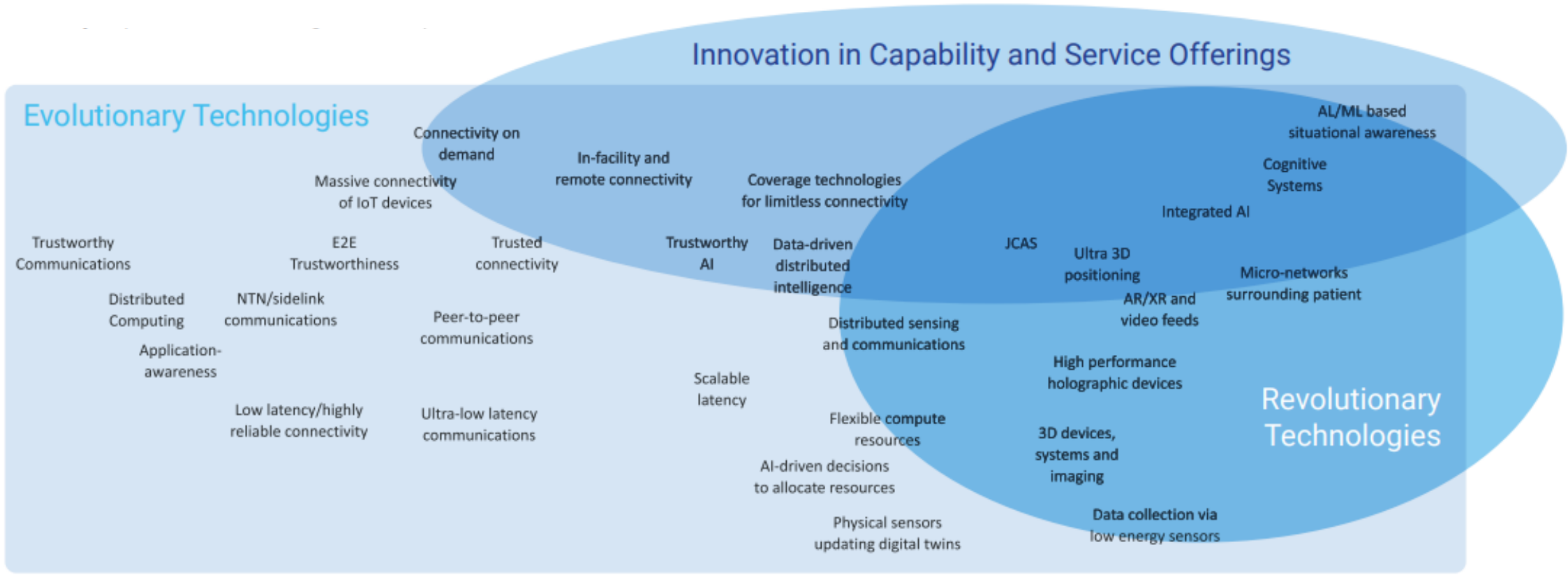
Mining

Public Safety

Smart Cities

- ✓ *Change how we live and work*
- ✓ *Translate North American needs to technology outcomes*
- ✓ *Target shared investments in 6G PoCs and testbeds*
- ✓ *Connect North American 6G needs to marketplace*

6G Technology Enablers



Distributed Cloud and Communication Systems (1)

6G will provide Distributed Cloud and Communication Systems where communications and unified computing services work together and scale across devices, network computing resources, and data centers.

National Imperatives

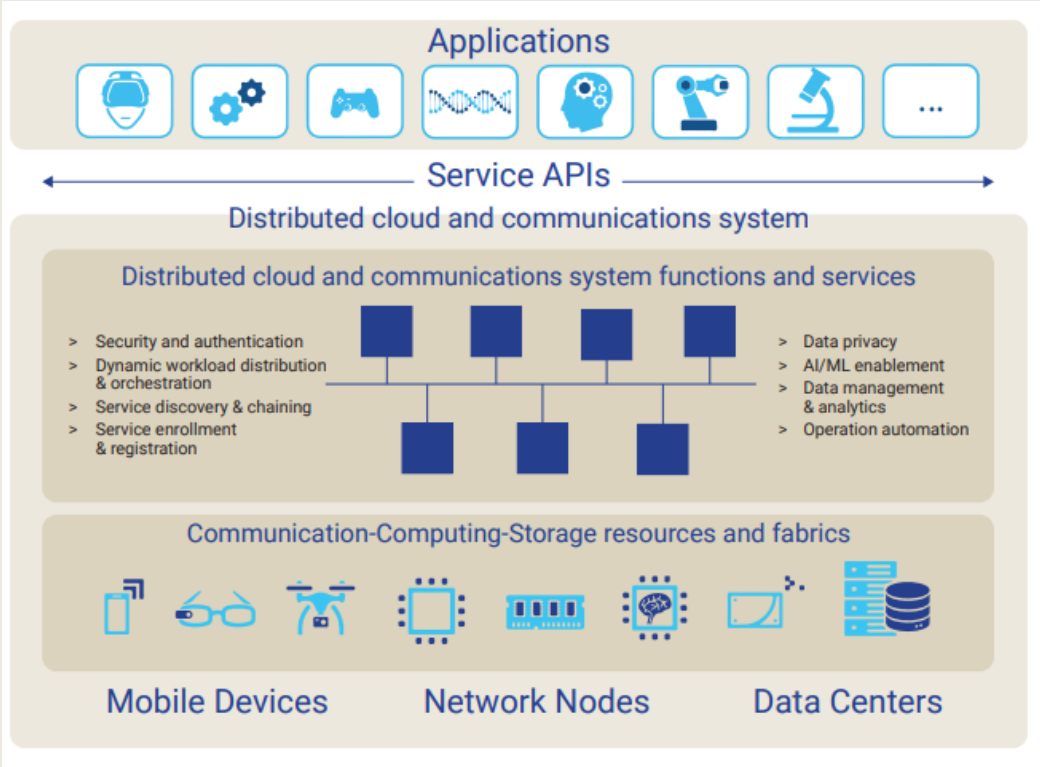
- Apply North America's expertise in cloud and software to shape the transformation to cloud-native mobile networks
- Consistent quality of service for low-latency mission critical applications and services

Research Challenges

- Technologies to facilitate deployment of large-scale network compute fabrics
- Innovation, integration and interoperability of edge devices
- Autonomic decision-making involving distributed and federated learning

Distributed Cloud and Communication Systems (2)

- 6G requires a mindset shift so that 6G is a system for both communication and distributed cloud computing.
- Integration between communication and computing domains is required so that 6G is a native part of the cloud.
- Research needed
  - How can computing services and data services be introduced into 6G systems alongside communication services?
  - What is the right level of coupling between communication and computing?
  - How can seamless computing and storage access be ensured when using distributed nodes in the 6G system?
  - How can the 6G wide-area cloud incorporate both mobile device compute and network compute?
  - How can the system leverage cloud computing technologies such as orchestration, micro-services, and service mesh?



Collaboration is Key to the Success

NGA is progressing an action-oriented agenda:

- Foundational documents lead to recommended priorities and actions
- Prioritization of 6G research aligned to NGA vision and North American needs
- Increasing the velocity of 6G research and collaboration across the ecosystem
- Holistic approach that leverages research outcomes to promote new opportunities (e.g., jobs of the future, education, innovation, and future societal needs).

North American 6G leadership requires collaboration across government, industry, and academia

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